



HARVARD Kennedy School

RAPPAPORT INSTITUTE for Greater Boston

Greater Boston Applied Field Lab

Summary of Activities 2021 – 2022



Field Lab students and faculty at Boston City Hall after presenting the Digital Equity and BERDO projects to Mayor Michelle Wu

The 2022 Field Lab

The 2022 Rappaport Greater Boston Applied Field Lab was conducted fully in-person for the first time following two years of remote learning during the pandemic. The teaching team and students were thrilled to be together, despite the remaining Covid restrictions that were in place at the beginning of the semester, such as mask mandates. As the semester went on, Harvard was able to relax the policies, and by mid-semester, the class was able to enjoy smiling at each other again. The client cities from the Greater Boston area brought excitement and dedication to their students, contributing to the exceptional work produced by the teams. All in all, it was one of the most joyful iterations of the Field Lab ever.

Sadly, there was someone missing. Those of us who had the privilege of working with Jerry Rappaport for many years mourned his passing. In previous years, Jerry had supported the Lab with his advice, humor, and anecdotes, and he and Phyllis Rappaport had attended many of our students' final presentations in local cities over the past 17 years. In particular, Jerry had been engaged in our project on Inclusionary Zoning in Revere during the spring of 2021, providing astute insight into the housing situation (as well as amusing stories involving bootleggers and bygone days in Revere). This year, a student team worked on a second project on inclusionary zoning – this time in Lynn – and we missed Jerry dearly.

Students who worked on follow-on summer projects in Revere and Lynn have now collaborated and together with Professors Linda Bilmes, Brian Iammartino and Justin DeBenedictis-Kessner (JDBK) have written up the research from Revere and Lynn into a working paper, dedicated to Jerry, that will be published in November 2022. We expect the paper will further the scholarship and practice around IZ in the Greater Boston area and beyond.

Course Overview

The Rappaport Greater Boston Applied Field Lab attracts students from across all of Harvard's graduate schools, as well as from MIT and Tufts, to participate in experiential learning. Since 2019, the field lab has been co-listed at the Harvard Graduate School of Design, fulfilling the GSD's field-learning requirement. This year, MLD-412 accepted 33 exceptional students from across HKS, GSD and MIT. As usual, the course was highly selective, with more than twice as many applicants as we could accept. Several of the students are pursuing dual degrees in business administration (at Harvard Business School, Stanford, Wharton, MIT Sloan, and Tuck) and/or urban planning.

For the first time ever, we had a deaf student in the class. This was a significant milestone and learning experience for all of us. Sheila Xu, an MIT graduate who is fully deaf, faced many challenges during Covid, especially as she could not use lip-reading due to other students wearing masks. We had sign language interpreters in class with us at all times, and faculty and speakers used clear masks.

Field Lab Teaching Team

The teaching team was led by Professor Linda Bilmes, former Assistant Secretary and CFO of the U.S. Commerce Department. She was assisted by Adjunct Professor Brian Iammartino, CFA, who provided accounting expertise and his years of experience in the private real estate development industry. Assistant Professor of Public Policy Justin de Benedictis-Kessner (known widely as "JDBK") also assisted with the instruction of the Field Lab for his second year. He brought his expertise in local governance and equity issues to the field lab, especially to our projects on Digital Equity with the City of Boston.

Our alumni Teaching Fellow Brian Cain (HKS '22) held weekly review sessions and office hours. Brian and three Course Assistants—Sunghea Khil (HKS & GSD '22), Amanda Jaffe (HKS '22), and Jaylen Hackett (HKS '22)—led additional skills sessions during weeks with large in-class projects due and provided analytical, logistical, and team management support to the teams throughout the semester. The student team brought their own experiences from taking the lab in

the previous year. Brian had worked on an MLD-412 project with the Boston Water and Sewer Commission and Climate Ready Boston on Stormwater. Sunghea had worked on a project with the MBTA regarding IT systems, and Amanda worked with Mount Vernon, NY on their new fitness center. Jaylen was new to the Field Lab, but quickly learned how the projects were structured, and ensured that materials were provided in advance to the deaf translators.

During the school year, the Field Lab had to say goodbye to both Program Manager Susan Krusell and Faculty Assistant Yahya Chaudhry, as they transitioned to wonderful new opportunities for their respective careers. Yahya continued to provide some logistical support throughout the year. Professor Bilmes' new Faculty Assistant, Paula Soumaya Domit, joined early in the semester and brought positive energy, incredible organization, and impressive policy analysis skills to the team.

After Susan's departure in early March 2022, the teaching team took on her responsibilities, which was a substantial task. The entire team handled the vetting of student presentations, scheduling and coordination with city partners, travel and logistics, team building exercises, managing the project deliverables and other activities, in addition to teaching and managing the projects themselves.



The Field Lab in Boston City Hall discussing the Digital Equity project with Amy Mahler, Yo Deshpande, and Peter Favorito from Mayor Wu's office

Project Selection

During fall 2021, the teaching team reviewed project requests from a dozen cities and organizations and eventually narrowed the field to fully scope five projects with prospective partners, based on Professor Bilmes longstanding criteria over the last 16 years :

- Strong engagement from the Mayor or senior official.
- Challenging projects requiring analytical rigor and related at least partly to financial and operational issues.
- Defined goals that could be completed within an academic semester.
- Engaged project-level partner to work with the students directly.
- Desire from the client partner to host a summer fellow.

The projects selected for 2022 were:

City/Partner	Topic	Client Partner
Boston, MA	Identifying Priorities for funding to promote Digital Equity	Mayor Michelle Wu
Boston, MA	Assisting Multi-Unit Buildings to comply with revised the Building Emissions Reductions & Disclosure Ordinance (BERDO 2.0)	Mayor Michelle Wu
Massachusetts Bay Transportation Authority (MBTA)	Helping MBTA assess alternative-source revenue, with focus on options for development of the Lynn Garage site as transit-oriented development	MBTA General Manager Steve Poftak
Revere, MA	Create a plan and operating budget for a new Health & Wellness Center in Revere	Mayor Brian Arrigo
Lynn, MA	Inclusionary zoning in Lynn (with developers' perspectives); Compare to Revere '21 project	Rep. Seth Moulton Mayor Jared Nicholson

2022 Field Trip

Thanks to loosening Covid restrictions, the class was able to conduct the project field trip again for the first time since 2020. Students visited four sites on Friday February 11 between 7am and 7pm. The trip started at Boston City Hall to hear about the Digital Equity project, then traveled to Revere for the Health & Wellness Center project and ended in Lynn where the class learned about both the MBTA garage and Inclusionary Zoning projects. More detail and pictures from each stop is below.

Boston City Hall: Digital Equity

After meeting outside HKS to take attendance and board the bus, the class traveled to Boston City Hall. Our client partner contacts – Amy Mahler and Yo Deshpande from the Mayor’s Office of New Urban Mechanics, Peter Favorito from the Department of Innovation & Technology, and Special Advisor to the Mayor Daniel Lander – met with the class to describe the project and answer questions. They also included leaders from the Prince Hall Masonic Lodge to speak about their experience receiving a Digital Equity Fund grant. The students were introduced to the two programs the city was comparing, the Boston-funded Digital Equity Fund and the Federal Affordable Connectivity Program (ACP).



Heather Hanson (interpreter), Amy Mahler, Peter Favorito, Yo Deshpande presenting the Digital Equity Project in Boston City Hall

Revere: Health & Wellness Center

The bus drove to the City of Revere, where it picked up Mayor Brian Arrigo from a coffee shop. As the class drove through the city, Mayor Arrigo described the history and current state of major sites we passed. The bus stopped at 123 Charger St, the location of the Health & Wellness Center. The city of Revere arrange for us to eat delicious, pre-ordered lunches from Kelly's Roast Beef outside of the Center before a tour led by Mayor Arrigo, CFO Rich Viscay, Chief of Staff Kim Hanton, and Parks & Recreation Director Michael Hinojosa.



Mayor Brian Arrigo gives a bus tour of Revere next to Professor Bilmes



Lunch outside of 123 Charger St in Revere

Lynn MBTA Station

Parking Garage: Alternative-Source Revenue

The final two stops were in Lynn, as two projects were located there. The first stop was at the MBTA's Lynn Station Parking Garage. Here we met MBTA employees Christina Marin, David Lepore, and Bruno Lopes. They gave the class a tour of the partially decommissioned garage and answered questions about the potential alternative uses for the garage under consideration. The students had fun taking pictures in the yellow safety vests required for certain areas of the garage.

Students listening to MBTA officials on the roof of Lynn Garage



Students posing in their yellow protective vests (Left-Right: Isabela Reis, Gemma Holt, Camille Choe, Sheila Xu)

Lynn: Inclusionary Zoning

Our final stop was in Lynn. We were met by Congressman Seth Moulton (MA-6), and Mayor of Lynn Jared Nicholson. In keeping with the Field Lab’s longstanding tradition of supporting local business, we convened at the [Land of a Thousand Hill Coffee](#) shop in Lynn, 501(c)3 business which reinvests profit to the underserved homeless youth on the North Shore, and to Rwanda. Congressman Moulton and Mayor Nicholson explained the goals of the project and answered student questions. After the presentation, the class enjoyed excellent fair trade coffee and cookies from the cafe and went on a walking tour of the City.



**Congressman Seth Moulton meeting with the 412 students
and describing the Lynn Housing Project**

Field Trip Conclusion

On the ride to Cambridge from Lynn, Professor Bilmes used the bus microphone to give her annual “honest analysis” of each of the projects by presenting the tradeoffs between the projects. This description is immensely helpful to students as they decide which projects to rank highest in their project preference survey. The field trip concluded at approximately 7pm when the bus arrived at HKS. Additional photos from the day are below.





Course Instruction

The teaching team did its best to offer a unique, creative, and enriching field experience for students, even under the constraints of Covid.

The foundation for MLD-412 student learning remains the Field Lab pedagogy developed over the last 17 years. Professor Bilmes began the '22 class by providing a grounding in fiscal decentralization and municipal budgeting theory from the perspective of local, state, and federal

governments. The teaching team also conducted lectures: Brian Iammartino taught students about financial spreadsheets and government financial reporting; Justin de Benedictis-Kessner taught the class about social and racial equity through a case study on Flint, MI.

Guests were invited for their experience in other skills and topics. Jeff Blossom, from Harvard's Center for Geographic Analysis, trained the students in GIS mapping exercises based on the skills needed to enhance each project. Ed Glaeser from the Economics Department taught about the economics of cities. Alessandra Seiter and Daniel Becker from the HKS Library taught students about conducting literature reviews (and helped compile an initial list of resources for each team). Colin MacNaught, MLD-412 alumni and the CEO of BondLink, taught students about municipal bonds. And Mauricio Rodas, former Mayor of Quito, Ecuador, spoke about his work to expand the financial capabilities of cities and local governments to promote change and climate action.

As ever, the central building block of the course, the Foss Park and Parkrose financial analysis modeling exercises, advanced each student's ability to craft insightful financial models. Professor Bilmes, Professor Brian Iammartino, and the rest of the teaching team worked via Zoom and in-person in the evenings and over weekends to support teams as they developed innovative ways in which to create financial spreadsheets and analyze the challenges posed by these cases.

Field Lab Community in 2022

2022 Student Teams – Project Highlights

The teams worked throughout the semester, including multiple site visits, weekly check-in meetings with each city partner, interim presentations, and technical revisions. As always, the students used a mixed-methods approach depending on the analytic requirements of each project. Methods included: qualitative interviews, data collection and analysis, multi-variate regressions, financial modelling, geospatial analysis, budget analysis, cost accounting, and conducting surveys.

The project deliverables to the cities included: a financial model, transmittal memo explaining the methodology and use of data, geospatial maps, and results of data analysis, surveys and interviews, and a final presentation. During the first week of May, the students presented their research findings in person to Boston Mayor Michelle Wu, Congressman Seth Moulton, Lynn Mayor Jared Nicholson, MBTA General Manager Steve Poftak, and Revere Mayor Brian Arrigo. It was a special pleasure for the students to meet with Mayor Wu and discuss not only our current projects, but also her experience as a Rappaport fellow years ago.

The field lab placed Rappaport Public Finance summer fellows in all the projects, including in Revere, Boston (2), Lynn (2), and MBTA. The course achieved among the highest course ratings at HKS, as it has done in every year since its inception.

Boston – BERDO Multi-owner buildings

Background: Buildings account for nearly 70% of greenhouse gas emissions in Boston. Reducing these emissions is an important part of the City's plan for achieving net zero emissions by 2050. To learn more. Boston recently updated its Building Energy Reduction & Disclosure

Ordinance (BERDO). The revised BERDO (2.0) requires buildings of 20,000 square feet or larger and or 15 units to *meet* certain emissions reductions if they want to avoid paying fines. Compliance for single-owner buildings is relatively straightforward because the owner is the decision-maker. However, it is more complicated for multi-owner buildings (i.e. condominiums) to comply with the new regulations because decision-making in these properties is more complex. The MLD-412 field lab team used GIS analysis, stakeholder interviews, financial modeling, and peer city benchmarking to understand and create resources or condo compliance with BERDO 2.0.

Key Findings

- Conceptually, thinking about capital investments in terms of carbon emissions intensity rather than energy efficiency is very new for Condo owners and board members. Most of those interviewed were still focused on energy consumption.
- The compliance journey is a multi-step process. Condo owners want to know specific steps their building can take to reduce emissions and be directed to specific sources of funding appropriate for their building.
- Given the diversity of condo types, there is no one-size-fits-all path to achieving BERDO compliance; for example, older buildings typically require different steps than new buildings. The project identified challenges and priorities in different types of buildings and configurations and created maps of building types and based on age, construction, design, heating and air conditioning systems, roof and window design.
- Boston is recognized as a leader on this issue, yet it is facing many of the same challenges as other cities when it comes to communicating with multi-owner buildings.

Boston – Digital Equity

Background: Digital Equity (DE) is the “condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy,” (National Digital Inclusion Alliance). Boston has made some efforts to pursue DE, most notably the Digital Equity Fund which provides mini grants to nonprofits and other organizations that serve populations in need. In addition, there is a federal Affordable Connectivity Program (ACP) that provides funding to qualifying individuals for devices and internet service.

Boston asked the Field Lab to help assess whether the city should invest more resources in the Digital Equity Fund to create more grants, or use those funds to promote the ACP among Bostonians, or undertake other measures. The project examined who needed the DE resources and how money was being spent by different current grantees. The team surveyed current grantees, conducted interviews, peer city benchmarking, geospatial and financial analysis to help the city answer this question.

Key Findings/Recommendations

- Boston should continue providing mini grants through the Digital Equity Fund because it leverages existing organizations, helps to access hard to reach populations, is in line with other cities, and above all it can be used for critical training (which the ACP cannot). It should also conduct a comprehensive research assessment of Boston residents' access to digital services, to better understand the needs.
- Boston can increase ACP enrollment by setting up digital navigators as other cities have done and expand outreach through additional marketing campaigns.
- Greatest needs include seniors, non-English speakers, and certain disabled individuals, including the deaf and mobility impaired.
- Relative to its goals, the Boston DE effort is understaffed with only one full-time employee. The city can build long-term capacity to pursue digital equity by hiring, creating a Digital Equity Coalition of partners, and/or signing contracts with device vendors that require them to contribute training as part of their contracts.

Lynn/MA-6th – Inclusionary Zoning

Background: The purpose of this project was to investigate the optimal parameters for a prospective IZ policy in Lynn that maximizes the creation of affordable units whilst also keeping development financially feasible. The project was similar to the Revere project from 2021, however this iteration built on that project by interviewing multiple building developers in Lynn to better understand their decision-making process and thresholds for construction.

Note: Students from the from the Revere '21 project and the Lynn'22 project who worked on follow-up summer projects in Revere and Lynn have now worked with Professors Bilmes, DeBenedictis-Kessner and Iammartino to write this research into a working paper, which will be published by the Kennedy School and Rappaport Institute in Fall 2022. (See details in Summer Fellows section)

Key Findings

- Regional AMI limits do not match the local context of housing affordability in the City of Lynn and nearby peer cities
- Compared to peer cities, Lynn has a lack of housing production relative to its population growth.
- The viability of IZ - and all development - is extremely sensitive to the costs of construction.
- Affordable units (50-60% AMI) are feasible depending upon project specifications. Deeply affordable (30% AMI) is extremely difficult to implement except at low set-asides or with heavy incentives and/or subsidies.
- If developers cannot reach their hurdle rates under IZ policies, they will likely raise rents on market rate units or not build at all.

- There is a tradeoff between parking and feasible construction of affordable housing units. Parking reductions would be the most effective standalone incentive, followed by a combination of density bonuses and permitting waivers.

MBTA – Lynn Station Parking Garage

Background: The field lab has been working on projects for the Massachusetts Bay Transportation Authority, (MBTA) for the past decade. These projects have included capital budgeting (e.g., acquisition of new trains and equipment, construction, and operating cost implications of the capital plan); environment (e.g., flooding risks, energy consumption, and contingency plans); procurement and operations. More recently, the MBTA has become interested in securing new sources of revenue and the field lab has undertaken projects that examined the agency’s ability to secure revenue through commercializing new product development, selling back-up power, and selling off fixed assets.

This project concerned the MBTA’s desire to leverage some of its real estate assets. The team analyzed the potential future uses for the Lynn Parking Garage, which is currently underutilized and in disrepair. The constraints included seeking uses that maximize financial return to the MBTA (or minimizes loss); preserve the optimal level of parking spaces; and provide benefit to the community of Lynn. Even pre-pandemic, parking utilization rates were very low. Moreover, the garage is in a state of repair such that the MBTA is considering closing and potentially demolishing the facility for safety reasons. However, the MBTA has yet to determine future use of the site. The team conducted interviews with developers and other stakeholders, geospatial analysis to understand the site area, and a financial analysis including a complex financial model that estimates the financial outcomes of various uses for the land.

Key Findings

- The financial model and qualitative analyses suggest that a Transit-Oriented Development is the most promising option for alternative source revenue.
 - Projected range of \$28 million profit to (\$4 million) loss
- Developers, the City, and community members are concerned about the tradeoff between parking and housing.
- Despite Lynn’s lack of parking requirement for the garage’s zoned land use, interviews suggest that the parking ratio should not be higher than 0.5 per housing unit due to the demand for smaller housing units downtown and high construction cost of parking spaces.

Revere – Health & Wellness Center

Background: The City of Revere, led by Mayor Brian Arrigo, is interested in providing more options for health and wellness for residents. It has recently leased a large Health & Wellness Center facility that is run-down and ill-suited for the community.

The student team assisted the city in developing a prospective financial operating plan for the Health & Wellness Center to be refurbished and operated, with a dual goal of identifying community demand for specific services (e.g., Zumba, Yoga, Weightlifting, etc.) and estimating the operating costs of the center at different levels of participation and fee structure. In the short

term (3-5 years) the City can fund the operating costs using the American Rescue Plan Act (ARPA) funds. However, to provide these services over the long-term, the Center must produce enough revenue to cover costs. Additionally, the City wants to ensure that the services are provided in an equitable manner, broadly defined, which involves providing public transportation from key locations such as the high school and MBTA stations.

The student team interviewed similar facilities (public and private) in the region, conducted a survey of residents, used geospatial analysis to understand potential demand for and accessibility of the Center, and created an incredibly professional and detailed financial model to show how different services, cost structures, and attendance levels affect the bottom line.

Key Findings

- The younger and non-white portion of Revere's population lives in South Revere, but a key demographic (households with median income of \$13k-50k) lives nearby the Center.
- There are relatively few fitness studios in the area surrounding the Center, but several gyms, daycares, and martial arts studios.
- There is no direct public transportation from any of the schools in Revere to the Center; the team proposed a bus route that would pick up at all four schools and get to the Center in 22 minutes.
- 158,000 people live in a 10-minute driving radius from the Center (64,000 within a 20-minute walk).
- Benchmark centers offer a wide range of services and have varying cost structures. Yoga is the single most popular service that residents pay for.
- The financial model shows that there are avenues to make the center self-sufficient, but also estimates how much the City would need to subsidize under different scenarios



The Revere Team presenting the Revere Wellness Center Project to Mayor Brian Arrigo

2022 Rappaport Public Finance Summer Fellows

The Field Lab sponsored six Summer Fellows following on the term time projects, semester, who were integrated into the regular Rappaport Fellows program thanks to help from Polly O'Brien and Kathryn Carlson.

- **Rozalyn Mock & Megan Willis-Jackson** researched inclusionary zoning in Lynn and Revere and co-authored a white paper, together with 2021 Summer Fellow Bobby Wang (Revere) on inclusionary zoning policy. The paper is a resource that the Rappaport Institute will provide to practitioners and cities for exploring inclusionary zoning as an approach to increasing the number of affordable housing units. The research explores how to determine the feasibility and impact of inclusionary zoning on local development, taking into account the perspectives of the city, developers as well as income and housing data on the municipality.
- **Isabela Reis** worked in the City of Revere, conducting research on the non-profit space in the city. She surveyed a diverse sample of over 25 non-profit leaders across issue areas in Revere to pinpoint their strengths, challenges, threats, and opportunities; with the goal of understanding how the City Government can best support these organizations and foster a thriving non-profit space in the city. The research is being used to improve communication between the City Government and non-profits, adapting municipal grants programs, and promoting a “hub-concept” for non-profits in the city.
- **Charuvi Begwani** completed her fellowship with MBTA where she looked at alternative uses and transit-oriented development (TOD) for the underutilized Lynn Commuter Rail Parking Garage. She conducted a high-level needs assessment of the Lynn Garage site and potential private developer proposals. Working with the Finance, Real Estate and Parking teams, she provided detailed documentation of needs, limitations, and decision items related to land uses, parking, bus and rail infrastructure, amenities, utilities, and post-deconstruction status. Her final deliverable was a framework for a structured Invitation to Bid document to guide MBTA in drafting and releasing an improved ITB to private developers.
- **Jordan Biggers** worked for the City of Boston’s Department of Innovation & Technology, partnering with stakeholders to establish the City’s Digital Equity & Resilience Strategic Framework and Project Management Plan for building the Pillars of Digital Equity & Resilience. This project supported the City’s longstanding efforts to close the digital divide for low-income and vulnerable communities as exacerbated by the Pandemic. Jordan implemented various components of the plan including progress reviews, a rebranding and marketing strategy for the digital equity fund and affordable connectivity program (ACP), and helped to set up ACP Digital Navigator Data Security Protocols.
- **Zeina Majdalani** worked on a project with the City of Boston’s Environmental Department and created energy efficiency survey for inspectors to use to capture energy conservation opportunities and cost savings from retrofits in Boston’s building stock.